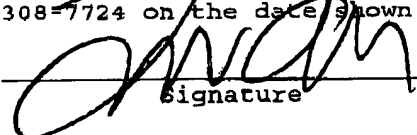


GR 97 P 1593 P

BOX AF

## CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that this paper for Serial No. 09/436,598 is being facsimile transmitted to the Patent and Trademark Office fax number (703) 308-7724 on the date shown below.

  
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11/8/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Andreas Lenniger et al.

Applic. No. : 09/436,598

Filed : November 9, 1999

Title : Power Semiconductor Module With Ceramic Substrate

Examiner : David E. Graybill

Group Art Unit : 2827

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A M E N D M E N T under 37 C.F.R. § 1.116

NOV 04 2002

BOX AFHon. Commissioner of Patents and Trademarks,  
Washington, D. C. 20231

TECHNOLOGY CENTER 2800

S i r :

Responsive to the final Office action dated July 3, 2002  
kindly amend the above-identified application as follows:

In the Claims:

Cancel claim 2.

Claim 1 (twice amended). A power semiconductor module,  
comprising:

semiconductor components and connecting elements;

a plastic housing having an interior, a flat inside, and  
openings formed therein, said openings having an inner side  
adjacent said interior;

a substrate disposed in said plastic housing defining a  
housing base of said plastic housing, said substrate  
containing a ceramic plate having a top side and a bottom side  
with a top metallization layer disposed on said top side and a  
bottom metallization layer disposed on said bottom side, said  
top metallization layer facing said interior of said plastic  
housing being patterned in order to form conductive  
interconnects and equipped for and receiving said  
semiconductor components and said connecting elements;

terminal elements in said plastic housing for providing  
external terminals, said terminal elements having lugs, said  
terminal elements in the region of said lugs being press-  
fitted into said openings in said plastic housing, said  
terminal elements bearing on said flat inside of said plastic  
housing, and said lugs pressing against said inner side of said  
openings for fixing said terminal elements in position; and

wires bonded to said terminal elements and to said  
semiconductor components.

Remarks:

Reconsideration of the application is requested.

Claims 1 and 3-7 remain in the application. Claim 1 has been amended. Claim 2 has been cancelled.

In the second paragraph on page 4 of the above-mentioned Office action, claims 1 and 3-6 have been rejected as being anticipated by Applicant's admitted prior art under 35 U.S.C. § 102(a). In the third paragraph on page 5 of the above-mentioned Office action, claims 1 and 2 have been rejected as being unpatentable over Applicant's admitted prior art and further in combination with Nakamura (Japanese Patent Application No. 7153906) under 35 U.S.C. § 103(a). In the second paragraph on page 6 of the above-mentioned Office action, claim 7 has been rejected as being unpatentable over Applicant's admitted prior art and further in combination with Leukel (French Patent Application No. 2 535 898) under 35 U.S.C. § 103(a). In the last paragraph on page 6 of the above-mentioned Office action, claim 7 has been rejected as being unpatentable over the combination of Applicant's admitted prior art and Nakamura, and further in combination with Leukel under 35 U.S.C. § 103(a).

The rejections have been noted and claim 1 has been amended in an effort to even more clearly define the invention of the

instant application. More specifically, the feature of claim 2 has been added to claim 1.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 1 calls for, inter alia:

a plastic housing having an interior, a flat inside, and openings formed therein, said openings having an inner side adjacent said interior; and

terminal elements in said plastic housing for providing external terminals, said terminal elements having lugs, said terminal elements in the region of said lugs being press-fitted into said openings in said plastic housing, said terminal elements bearing on said flat inside of said plastic housing, and said lugs pressing against said inner side of said openings for fixing said terminal elements in position. (Emphasis added by Applicants).

In the prior art described by applicants in the specification of the instant application, it is not disclosed that openings are formed in the housing and lugs are formed on the terminal elements, the terminal elements in the region of the lugs are press-fitted into the openings in the plastic housing, the terminal elements bear against the flat inside of the plastic housing, and the lugs bear on the inner side of the openings for fixing the terminal elements in position. The object of the instant application is to overcome the disadvantages of the conventional injection molding of the terminal elements into the housing (see page 2, lines 1-13 of the specification). In order to achieve this object, the

inventors of the instant application first conceived the concept of press-fitting the terminal elements into openings formed in the housing.

In order to even more clearly convey the invention of the instant application to the Examiner, Applicants will explain the invention in even greater detail below with the help of the enclosed partially exploded hand-drawn sketch illustrating the cooperation of a specifically embodied housing and a terminal element, and an original production sketch showing an actual embodiment of the invention of the instant application.

With reference to the hand-drawn sketch, two factors in combination with each other play an important role for the invention of the instant application. It is an important aspect that the rear side (11r) of the terminal element (11) bears flat especially on the rear side of the housing part (2) and ensures a solid fit. Furthermore, the housing part (2) guides the terminal element (11) at the bottom side (11b) as well as laterally (11s).

In addition, a guide in a specifically embodied housing part (2) is also ensured at the front side of the terminal element (11), i.e. towards the interior of the housing in that lugs (13) press against the corresponding parts of the housing part (2). By inserting the terminal element (11) into the housing

part (2), the lugs (13) are pressed against the corresponding locations of the housing part (2) so that the rear side of the terminal element (11) is pressed from the inside against the side wall of the housing part (2).

Fig. 1 of the hand-drawn sketch shows the assembled condition, while Fig. 2 shows the housing part (2) alone and Figs. 3 and 4 show the terminal element (11) alone. These figures of the hand-drawn sketch correspond to the drawings of the instant application. The drawings of the instant application result from the figures of the hand-drawn sketch by cutting along section line A.

It is only the extremely solid fit of the terminal element (11) in the housing part (2) which makes it possible to apply bonding connections. If the terminal element (11) sits relatively loosely in the housing part (2), the terminal element (11) could be ripped away during the bonding when the bonding tools are taken away, because a certain tractive effect is present due to the attachment of the bonding wire. The terminal element (11) would then at least sit relatively loosely in the housing so that during operation, especially when contacts are plugged onto the terminal element, the bonding connection would be destroyed.

In contrast to the prior art, the invention of the instant application is thus characterized by the combination of the following features:

- a) The rear side (11r) of the terminal element (11) bears flat on the inside of the housing part (2) with its rear side.
- b) The terminal element (11) is guided in five directions from the housing part (2). It is to be pointed out that an additional pulling out in upward direction would indeed be possible and that in reality it is prevented by additional measures, which are not a part of the invention of the instant application.
- c) The fixing is created by the lugs (13) after they are inserted (in direction B) perpendicular to the inside of the housing part and thus ensure a solid fit.
- d) The above-mentioned measures serve the purpose of ensuring a safer bonding.

Contrary to the invention of the instant application, the lugs in Nakmura serve the purpose of preventing a pulling out of the terminal element against the plug-in direction. This, however, is not the case in the invention of the instant



application, as explained above. In the invention of the instant application, the pulling out is not to be prevented, but rather the terminal element is to be secured mechanically against wobbling in the housing part.

Clearly, none of the prior art references show lugs constructed towards the inside of the housing for spreading against a corresponding housing part in order to fix the same mechanically. None of the prior art references discuss the problem of bonding, because the terminal elements in all of the prior art references are to be soldered.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 1. Claim 1 is, therefore, believed to be patentable over the art and since all of the dependent claims are ultimately dependent on claim 1, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 1 and 2-7 are solicited.

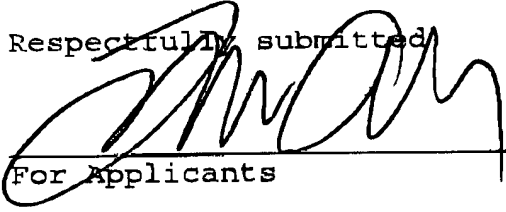
In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate a telephone call so that, if possible, patentable language can be worked out. In the alternative, the entry of the amendment is requested as

it is believed to place the application in better condition for appeal, without requiring extension of the field of search.

Petition for extension is herewith made. The extension fee for response within a period of one month pursuant to Section 1.136(a) in the amount of \$110.00 in accordance with Section 1.17 is enclosed herewith.

Please charge any fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted

  
For Applicants

LAURENCE A. GREENBERG  
REG. NO. 29,308

YHC:cgm

November 4, 2002

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